

Reconfigurable, Wideband Radar Transceiver and Antenna for P-band Stretch Processing, Phase I

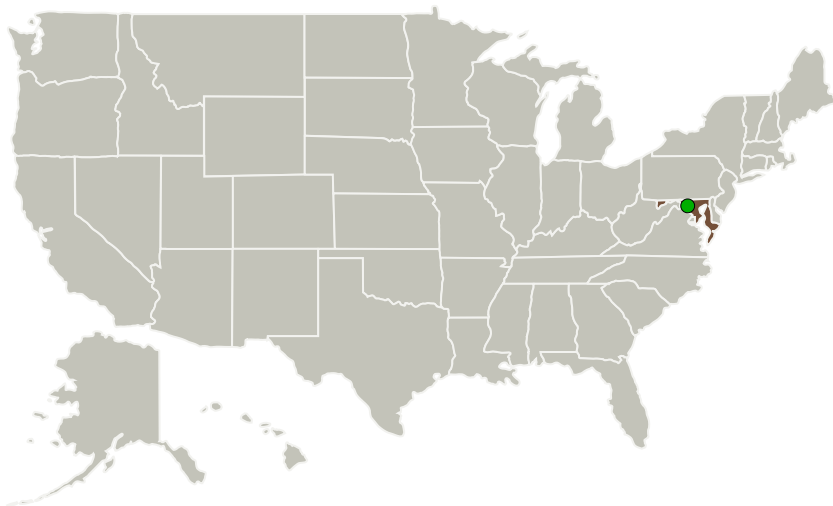
Completed Technology Project (2010 - 2010)



Project Introduction

IAI proposes to develop a Reconfigurable Wideband Radar Transceiver, with direct digital synthesis of P-band radar frequencies, novel high bandwidth P-band antenna design with high contrast ceramic material and digital implementation of receiver stretch processing, to achieve the solicitation objectives. Our innovation focuses on implementing maximum radar transceiver functionalities on high-speed digital reconfigurable platforms (FPGAs), and minimizing the number of analog components. Our Software-Defined Radar designs are based on COTS components and are modular in nature. This makes it easier to upgrade smaller units of the design with development in state-of-the-art, instead of re-designing the entire SDR. The stringent payload constraints of Unmanned Aerial Systems (UAS) require tight integration of all radar functionalities, including signal generation, acquisition, processing, and down-link. The proposed platform can be an enabler for low form factor radar systems to support on-going UAS based NASA missions for Biomass/ecosystems imaging in P-band. A summary of our proposed innovation are: 1. Reconfigurable digital waveform synthesizer with 600 MHz bandwidth capability. 2. Compact P-band antenna design using high-contrast ceramic materials to cover 200 MHz bandwidth. 3. Digital implementation of receiver stretch processing. 4. Low size, weight and power specifications making the radar design suitable for UAS applications.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Maryland

Project Transitions

▶ **January 2010:** Project Start

✓ **July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139392>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Automation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

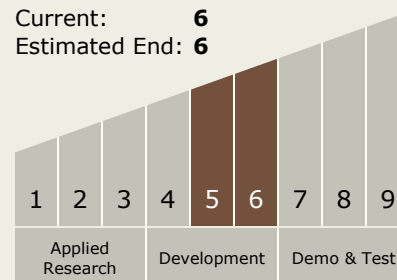
Carlos Torrez

Principal Investigator:

Arvind Bhat

Technology Maturity (TRL)

Start: 5
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System